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ABSTRACT

Internships are often put off until late in some students' programs of study. Furthermore, some academics are said to be reluctant to accept the legitimacy of applied work programs and thus cooperative education programs are not offered in some curriculums. This study invited students finishing their internship experiences to reflect on the legitimacy of internships as a method to prepare students for careers as computing professionals. The student subjects in this research were all computing majors (Computer Science, Information Systems, Telecommunications). The results reported in this study are based on two data collection methods. Fixed format scaled responses from a small sample were used to gather and analyze description statistics of graduating interns' perceptions. In addition, open format responses were evaluated, coded, and summarized from a larger super-set sample. Student responses were strongly favorable concerning their internship experiences. Most students described the internship as a great experience that had a major impact on their learning and on their understanding of real world issues and environments. Surveyed students overwhelmingly recommended that other students get involved in cooperative education opportunities. (Author)

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DO I/S STUDENTS VALUE INTERNSHIP EXPERIENCES?

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Internships are often put-off until late in some students' programs of study. Furthermore, some academics are said to be reluctant to accept the legitimacy of applied work programs and thus cooperative education programs are not offered in some curriculums. This study invited students finishing their internship experiences to reflect on the legitimacy of internships as a method to prepare students for career as computing professionals. The student subjects in this research were all computing majors (Computer Science, Information Systems, Telecommunications). The results reported in this study are based on two data collection methods. Fixed format scaled responses from a small sample were used to gather and analyze description statistics of graduating interns' perceptions. In addition, open format responses were evaluated, coded and summarized from a larger super-set sample. Student responses were strongly favorable concerning their internship experiences. Most students described the internship as a great experience that had a major impact on their learning and on their understanding of real world issues and environments. Surveyed students overwhelmingly recommended that other students get involved in cooperative education opportunities.

INTRODUCTION

Large employers increasingly demand work experience when hiring new college graduates. Cooperative education based industrial internship programs provide students an opportunity to gain work experience in their area of professional study. Furthermore, an internship demonstrates that the student is both informed and serious about their career direction. The significant impact of real-world experience is supported by the report that over 90% of recruiters say internship experience is viewed as an important factor in screening job applicants' resumes (Wilson 1997). Internship programs potentially provide benefits to the student intern, to the sponsoring organization, and to the academic department facilitating the cooperative education relationship.

Potential benefits to the student include: the opportunity to gain real-world work experience that is valued by industry recruiters; the opportunity to verify their interest and desire to pursue a career in a given profession or specialty area; the opportunity to learn more about a potential permanent employer; the opportunity to become more aware of the skills most valued by industry; the opportunity to select courses and steer their remaining course-work based on enhanced perspectives gained during their internships. In addition, student interns gain valuable skills, confidence, and the cogent prospect that they will reinforce previous course-work and better understand course topics by framing the concepts in terms of analogies and perspectives gained during real work experiences.

In return for their mentoring investment, sponsoring corporations obtain relatively inexpensive professional labor while concurrently conducting a pro-longed interview as a basis for hiring decisions. Moreover, a mutually successful internship experience enables an advantageous personal relationship that facilitates recruitment of the student following graduation (Tobias, 1996). Furthermore, the organization may gain

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new perspectives or practices based on new technologies and techniques that the student intern transfers from their university experiences.

The academic department benefits by strengthening their relationships with industrial partners while also obtaining feedback concerning the quality of their academic product (valued student/graduates). Moreover, feedback from both the sponsoring organization and the student interns provide insights to the skills being sought in industry. These insights assist the department's ongoing efforts in curriculum development and refinement.

Although several sources indicate students gain value from the internship experience (Tobias 1996; Wilson 1995), the evidence to support benefit claims is largely anecdotal. For example, the Association for Computing Machinery (ACM) career consultant, Jack Wilson, says it is extremely important in today's business environment to show evidence of relevant work experience. When university graduates are competing for top jobs at top companies they should expect to face tough competition from other academically qualified candidates. According to Wilson, "when you are competing for employment with other great students from good schools, with good grades and skills, your relevant work experience can make a big difference."

While the benefits proposed seem relevant and realistic; it is not evident that everyone concludes the benefits are real. In our academic program students are highly encouraged (semi-mandated) to participate in a relevant computing related internship. While a large proportion of our students seem eager to gain an internship experience, others are less enthusiastic, and some are skeptical about delaying their entrance into the real job (permanent employment) market. A few even voice the opinion that the internship program is a university supported industrial conspiracy to co-opt talented professional labor at below market wage rates.

RESEARCH QUESTIONS

The purpose of the study described in this manuscript is to analyze data that may empirically support claims related to benefits incurred by student interns. The research questions being evaluated are summarized in Table 1. The research focuses on student perceptions concerning the benefits of participation in cooperative work-study programs. Particularly we are interested in the "learning" that takes place during an internship work experience, as well as potential career direction and job placement benefits. We anticipate these findings will be meaningful to our future students, to curriculum planners, to the faculty supporting the internship program, and to our many industrial partners who continue to demonstrate increasing interest in sponsoring internship contracts.

METHODOLOGY

Graduating internship students are used as the data source in order to obtain credible results in the minds of prospective internship students. Graduating internship students are defined here as students who have successfully completed an internship experience; however, these students normally have more course-work to complete before they will graduate from our Applied Computer Science degree program. The analysis of survey data was conducted in two ways. First we conducted an analysis of previous student comments concerning internship experiences. This included parsing, coding, categorizing, and summarizing student comments regarding their internship experiences. These comment categorizations were then used in conjunction with a literature review to construct a Likert-type scaled survey instrument. The closed-format survey used a five point scale ranging from 1=Strongly Agree to 5=Strongly Disagree.

The scaled survey instrument was completed by a subset of our Summer 1997 student interns. The scaled survey subset is composed of students who returned their standard internship evaluation forms during regular office hours and thus could be requested to complete this supplemental survey. Results reported in this study are based on the small sample (n=18) of scaled survey responses along with a representative sample of student comments from a larger sample (n=76) who submitted a standard internship evaluation used by our cooperative education office. Open format narrative responses were culled from optional student replies to the question "What

TABLE 1

RESEARCH QUESTIONS

The following research questions are based on the perceptions of graduating internship students.

1. To what extent did the internship provide an opportunity to gain real-world work experience that seems to be valued by industry/recruiters.
2. To what extent did the internship provide an opportunity to verify whether to pursue a career in the I/S profession.
3. To what extent did the internship provide an opportunity to learn more about a potential employer.
4. To what extent did the internship provided an opportunity to gain confidence in professional skills and capabilities.
5. To what extent did the internship provide an opportunity to learn valuable skills that would be difficult to learn in a classroom.
6. To what extent did the internship provide the background to better understand course-work by comparing course concepts to real world computing experience.
7. To what extent did the internship provide an opportunity to gain awareness of what skills are used and valued in the workplace.
8. To what extent did the internship enable improved interpersonal communication skills.
9. To what extent did the internship enable improved technical skills.
10. To what extent did the internship provide an opportunity to redirect computing studies toward specific areas of interest.
11. To what extent did the internship provide an opportunity to select courses based on a more informed perspective.
12. Overall, how enjoyable was the coop experience?
13. Overall, how valuable was the coop experience?
14. Would you recommend that other students participate in a coop/internship experience?

would you tell other young ACS majors trying to decide whether or not to become involved in the Cooperative Education Program?" Narrative responses were parsed into 145 comments that were then coded for classification. These open format narrative comments are used to add richness and to supplement the descriptive statistical analysis.

RESULTS

Student responses provide strong evidence that the internship experience is worthwhile and valuable. Table 2 illustrates the percent of respondents who strongly agreed (item response=1), the mean score for the item on a five point scale, and the standard deviation. The survey items' number reflects the research question from Table 1.

Responses to the first research question show near unanimous agreement that student interns perceive the experienced gained to be valuable in terms of industry recruitment. All respondents responded with agree or strongly agree concerning the value of their real-world experience. Eighteen parsed comments relative to this question included several declaring job offers, others noting prospects for future employment with their coop sponsor, and others declaring valuable experiences that would help build their resume.

Responses to the second research question shows strong agreement that the internship helped to verify their desire to pursue a career in the computing profession. All respondents were in agreement on this item with the exception of one person who provided a neutral response. Coop experience allows students to get a taste of the real-world and thus to verify whether their targeted career area is in fact something they really want to do. For example, "Coop is a great experience - I got a taste of what my future job/career will be like" was reported by one student. In some cases real-world experience can also help confirm areas in which the person does not want to work. For example, one student commented "my coop helped me realize I don't want a career in COBOL coding."

Responses to research question three demonstrates widespread agreement that the internship provided the opportunity to learn more about a potential future employer. Only eleven percent of respondents were neutral concerning this item. In correspondence with all scaled item responses presented in this survey,

TABLE 2

DESCRIPTIVE STATISTICS REGARDING INTERNSHIP EXPERIENCE.

Survey Item Focus	% Strongly Agree	Mean Score	Standard Deviation
ITEM 1: valuable real-world experience	88.9	1.1111	.3234
ITEM 2: verify decision on I/S career	72.2	1.3333	.5941
ITEM 3: learn more about a potential employer	66.7	1.4444	.7048
ITEM 4: gained confidence in my capabilities	66.7	1.3333	.4851
ITEM 5: learned skills difficult to learn in classroom	66.7	1.3889	.6077
ITEM 6: background to better understand course-work	50.0	1.6111	.6978
ITEM 7: gained awareness of skills valued in workplace	55.6	1.4444	.5113
ITEM 8: improved my interpersonal skill	61.1	1.4444	.6157
ITEM 9: improved my technical skills	66.7	1.4444	.7048
ITEM 10: helped re-direct my studies to area of interest	38.9	1.7778	.7321
ITEM 11: enables course selection from more informed basis	33.3	1.7778	.6468
ITEM 12: Overall, how enjoyable was the coop experience	61.1	1.3889	.5016
ITEM 13: Overall, how valuable was the coop experience	77.8	1.2222	.4278
ITEM 14: (Yes/No item)	100.0		

there were no responses indicating disagreement with the statement. This limited response variance is reflected in the low standard deviations and seems to reflect widespread respondent agreement concerning the benefits associated with their internship experience.

Although the intern program is not intended to lead directly to job offers, several students reported in the free-format evaluation responses that they had accepted jobs with the internship sponsor. This corresponds with verbal comments received from many near-graduation seniors that they intend to start work with their internship sponsor. In addition to "firm" job offers for more senior students, several less advanced students commented on the internship as "a great way to get your foot-in-the-door with a good company" by building a network of business contacts.

Responses to research question four and five demonstrate that 2 out of every three students perceived the internship experience to have increased their professional self-confidence while also providing an opportunity to learn valuable skills that would be difficult to learn in a classroom environment. Student comments indicate learning to work cooperatively in large project teams, and to gain awareness of business etiquette, politics, and ambiguity. In addition, students learned that they can be successful in the semi-structured context of the real world and that there is value to the skills and knowledge they have been gaining from course-work. For example, one student commented that "coop builds confidence in your abilities and the value of what your learning (in class)."

Responses to research question six indicate that half of the respondents believe their internship will improve and benefit their understanding of course concepts by providing real-world experience for comparison and analogy. Narrative responses note the internship was valuable not only for learning new things but also for reinforcing skills learned in the classroom.

Responses to research question seven showed that most students strongly agree and that all respondents agree their internship gave them a better awareness of what skills were used and valued in the workplace. Narrative comments suggest some benefits in viewing new technologies and viewing technological trends.

Responses to research question eight and nine demonstrate that the internship enabled students to enhance both their interpersonal communication and technical skills. Many respondents commented that more learning occurs during the coop than in most classes. This tendency was especially salient in regard to soft skills, teamwork, and an appreciation for organizational environments and the realization of uncertainty. Importantly, all but one student agreed that their interpersonal communications skills were improved by their internship. "Soft skill" enhancement was also supported by narrative comments.

Responses to research question ten and eleven display agreement concerning the value of internships to enable more informed direction and decisions concerning the targeting of personal academic programs and courses toward specific career interest areas. Analysis of free-form comments indicate that for some students the internship experience came too late in their degree program because their few remaining courses were pre-determined by degree requirements. Other comments noted that the internship experience reinforced existing course-of-study plans rather than enabling new decisions. For example, one student stated "I only became more convinced that I want to take a course involving the design and implementation of web pages." Another student noted that "coop is a good idea; early in curriculum it can reshape your education." Another advantage of an early curriculum internship experience is that it allows for multiple coop experiences in varied work settings. As noted by one aspiring coop enthusiast "Coop is a great experience - I plan to do it again!"

Responses to research question twelve informed us that all fixed-format respondents found their internship to be enjoyable. Moreover, responses to research question thirteen demonstrates the students' perceived value of participation in an internship assignment. Nearly 80% of participants "strongly agree" and all others "agree" that the internship experience was valuable. Student comments, such as, "the intern experience is invaluable" leave little doubt as to the perceived value of time and efforts devoted to the internship program. In the words of another student "Do it! Coop is a great experience, plus you get paid!"

Responses to research question fourteen strongly support the wisdom of "Just Do It". Item fourteen asked for a simple Yes/No answer to the question "Would you recommend that other students participate in a coop/internship experience?" Unanimous (100%) agreement to this question indicates that internship experienced students overwhelming support the merit of cooperative education programs. While many narrative responses encouraged future students to take advantage of internship opportunities, several stronger comments declared the coop experience "should be absolutely required."

DISCUSSION AND LIMITATIONS

Unanimous agreement, such as demonstrated above for item fourteen, is surely in-part an artifact of the small sample used for analysis of scaled responses. Nonetheless, the free-format responses received from a larger sample were also nearly unanimous in supporting the value of internship experiences. Even the few negative comments received did not contradict the learning or professional value of a coop experience. The few negative comments received were focused on either paying fees for internship course credit, or a feeling that the student had been placed in a non-challenging or unpleasant work context. For example, one student protested "I don't see why we are required to pay ISU for internship hours -- I found the job myself and used no ISU resources!" In contrast to this complaint other students noted "it's great that working got me school credit" and that the coop office made finding a placement easy. Another less enthusiastic student noted "it wasn't the experience I was hoping for but now I have a better perspective on the real world." This last, somewhat negative, commentary suggest the student had in fact actually valued (if not enjoyed) the internship experience.

Recapitulating, virtually all scaled survey responses show coop graduates' perceived multiple benefits and value in their internship experience. Furthermore, approximately 98% of 145 parsed comments were favorable regarding the internship program. Moreover, the fact that intern graduates were willing to spend time preparing comments to share perceptions about their internship experience is further evidence of their enthusiastic interest level regarding the coop/internship program.

The following student comments capture the essence of perspectives gathered from student comments. From one pragmatic student we heard "It's (Coop) a great deal. You get course credit, work experience, and you get paid." A more learning focused comment proclaims, "the amount of knowledge you gain through a coop is incredible." Furthermore, a student providing counsel for new computing majors stated, "I would definitely encourage other students to participate in an internship. The internship provided me with a real sense of how the business world operates and enabled me to apply the knowledge I learned in the classroom to a real world situation." Finally, a senior student claimed the most pragmatic of benefits, "Great news! I will begin full-time employment with CAT in August."

In conclusion, students who have completed internship experiences highly recommend that other students invest in the opportunity to participate in cooperative education programs. The benefits perceived and reported by students include recruitment advantages, an excellent method of learning, better understanding of organizations and career focus, as well as reinforcement of course learned skills and enhanced confidence in their own professional capabilities. For institutions that are interested in serving the needs and values of their student stakeholder this research sends a clear message that students strongly value internship experiences. Institutions, faculty, curriculum planners, future students, and parents need to be aware of the very positive findings concerning participation in cooperative education workplace experiences.

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